MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2320
Gaithersburg, Maryland 20899-2320

SRM Number: 187e
MSDS Number: 187e
SRM Name: Sodium Tetraborate Decahydrate (Borax) pH Standard

Date of Issue: 20 July 2004

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Description: Standard Reference Material (SRM) 187e is intended for use in preparing solutions for calibrating electrodes for pH measuring systems. SRM 187e is a crystalline material provided in a unit of 30 g.

Substance: Sodium Tetraborate Decahydrate

Other Designations: **Sodium Tetraborate Decahydrate** (sodium borate; sodium borate 10-hydrate; borax; sodium biborate decahydrate; sodium pyroborate decahydrate; boric acid, disodium salt, decahydrate; borax decahydrate; sodium borate decahydrate; disodium tetraborate decahydrate)

2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Component: Sodium Tetraborate Decahydrate
CAS Number: 1303-96-4
EINECS: Not assigned.
SRM Nominal Concentration (mass %): 100
EC Classification: None listed.
EC Risk: None listed.
EC Safety: None listed.

3. HAZARDS IDENTIFICATION

NFPA Ratings (Scale 0–4): Health = 1 Fire = 0 Reactivity = 0

Major Health Hazards: Central nervous system depression. Kidney damage.

Potential Health Effects: Sodium tetraborate decahydrate may cause skin and eye irritation, blurred vision, or eye damage with short-term or long-term exposure. Short-term exposure by inhalation, ingestion, or skin absorption may cause skin disorders, fever, vomiting, diarrhea, stomach pain, difficulty breathing, irregular heartbeat, headache, drowsiness, dizziness, tremors, loss of coordination, ear damage, lung congestion, internal bleeding, blood disorders, heart damage, kidney damage, or coma. The same effects have been reported in long-term ingestion, inhalation, and skin absorption in addition to reproductive effects, loss of voice, loss of appetite, and convulsions.

Listed as a Carcinogen/ Potential Carcinogen:

Yes	No	
____	X	In the National Toxicology Program (NTP) Report on Carcinogens.
____	X	In the International Agency for Research on Cancer (IARC) Monographs.
____	X	By the Occupational Safety and Health Administration (OSHA).

4. First Aid Measures

Skin Contact: Remove contaminated clothing and shoes. Wash skin with soap and water for at least 15 minutes. Obtain medical assistance, if needed. Clean contaminated clothing before reuse.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration by qualified personnel. Get immediate medical attention.

Ingestion: If a large amount is swallowed, obtain immediate medical assistance.

5. Fire Fighting Measures

Fire and Explosion Hazards: Sodium tetraborate decahydrate is a negligible fire hazard. Sodium tetraborate decahydrate in contact with strong oxidizers is a fire and explosion hazard, and when heated with zirconium produces an explosive reaction.

Extinguishing Media: Use extinguishing media that is compatible for the surrounding material and fire.

Fire Fighting: Move container from fire area if possible without exposure to risk. Avoid inhalation of material or combustion by-products. As in any fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

Flash Point: Not applicable.
Method Used: Not applicable.

Autoignition Temperature: Not applicable.

Flammability Limits in Air
UPPER (Volume %): Not applicable.
LOWER (Volume %): Not applicable.

6. Accidental Release Measures

Occupational Release: Isolate the hazard area and deny entry. Collect spilled material in appropriate container for disposal. Keep out of water supplies and sewers.

Disposal: Refer to Section 13, "Disposal Considerations".

7. Handling and Storage

Storage: Store and handle in accordance with all current regulations and standards. Store material with the cap tightly closed, in a dry environment, and under normal laboratory conditions. Keep separated from incompatible materials.

Safe Handling Precautions: Use methods to minimize dust. See Section 8, "Exposure Controls and Personal Protection".

8. Exposure Controls and Personal Protection

Exposure Limits: Sodium Tetraborate Decahydrate
ACGIH (TLV): 5 mg/m^3 TWA
NIOSH: 5 mg/m^3 (10 h) TWA
OES UK: 5 mg/m^3 TWA

Ventilation: Use a local exhaust ventilation system. Ensure compliance with applicable exposure limits.

Respirator: For conditions of frequent use or heavy exposure where exposure is apparent and engineering controls are not feasible, respirator protection may be needed. Refer to the "NIOSH Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84" for selection and use of respirators certified by NIOSH.

Eye Protection: Wear safety goggles. **DO NOT** wear contact lenses in the laboratory. An eye wash station should be readily available near areas of use.

Personal Protection: Wear appropriate protective clothing and chemically resistant gloves to prevent skin exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Component: **Sodium Tetraborate Decahydrate**
Appearance and Odor: White crystals. Odorless.
Relative Molecular Weight: 381.37 g/mol
Molecular Formula: $Na_2B_4O_7 \cdot 10(H_2O)$
Density: 1.7 g/cm^3
Melting Point: 62.2 °C to 75.0 °C
Water Solubility: 5.8 % to 6.25 %
Solvent Solubility: Soluble in glycerol. Very slightly soluble in alcohol. Insoluble in acids.

10. STABILITY AND REACTIVITY

Stability: X Stable ____ Unstable

Stable at normal temperatures and pressure.

Conditions to Avoid: None reported.

Incompatible Materials: Sodium tetraborate decahydrate is incompatible with metals and oxidizing materials

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Thermal decomposition of sodium tetraborate decahydrate may produce oxides of boron and oxides of sodium.

Hazardous Polymerization: ____ **Will Occur** **X** **Will Not Occur**

11. TOXICOLOGICAL INFORMATION

Route of Entry: X Inhalation X Skin X Ingestion

Toxicity Data: Man, Oral LD_{Lo}: 709 mg/kg
Rat, Oral LD_{50}**:** 2 660 mg/kg

Target Organs: Central nervous system. Kidneys.

Medical Conditions Aggravated by Exposure: Respiratory disorders. Skin disorders.

Health Effects (Acute and Chronic): Acute toxicity level of sodium tetraborate decahydrate by ingestion shows it to be moderately toxic. See Section 3: "Hazards Identification" for potential health effects.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data: Fish, Guppy (Poecilia reticulata) LD_{100}: 5 000 mg/L, 24 years
Invertebrate, Tubificid worm LD_{100}: 2 000 mg/L, 24 weeks
Phytotoxicity Waterweed (Elodea canadensis): 2 mg/L, 21 months

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and IATA: No classification assigned.

Canadian Transportation of Dangerous Goods: No classification assigned.

15. REGULATORY INFORMATION

U.S. Regulations: CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.

SARA Title III Sections 302, 304, 313: Not regulated.

OSHA Process Safety (29 CFR 1910.119): Not regulated.

California Proposition 65: Not regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):
ACUTE: Yes.
CHRONIC: Yes.
FIRE: No.
REACTIVE: No.
SUDDEN RELEASE: No.

CANADIAN Regulations: WHMIS Classification: Not determined.

EUROPEAN Regulations: EC Classification: Not determined.

16. OTHER INFORMATION

Sources: MDL Information Systems, Inc., MSDS *Sodium Borate Decahydrate,* 19 March 2003.
SRM 187e; *Sodium Tetraborate Decahydrate (Borax) pH Standard*; National Institute of Standards and Technology, U.S. Department of Commerce: Gaithersburg, MD (2004).